CALFED Independent Science Board

February 21–22, 2007, Meeting Summary

Meeting Location

CALFED Bay-Delta Program, Delta Room, 5th Floor, Federal Building, Sacramento, CA.

Action Items

The ISB will likely meet via conference call one or more times between the February and June 6-8, 2007 meetings. Mount, Meyer, and Healey will determine topics that need immediate attention and will schedule meetings accordingly. The SP will coordinate public noticing of the conference call and will host a public meeting room with conference phone.

Individual Board Members

1. Baptista to check on the availability and usability of a web-based calendar tool that he is familiar with that displays free/busy times for meetings, based on input from meeting invitees. This tool could be useful for planning future ISB conference call meetings.
2. Mount and Fris to explore options to support conference calls meetings, especially web-based tools that would enable sharing of visuals. Keller suggested a program called "Go To Meeting."
3. Mount to provide ISB members with the list of candidates previously identified for the Lead Scientist position.
4. Draft and revision of letter to the Blue Ribbon Task Force regarding the PPIC report.

   Meyer and Norgaard to revise draft letter to Blue Ribbon Task Force based on ISB member comments

   Meyer and Norgaard to submit this revision to ISB members via email.

   Meyer and Norgaard to finalize the letter based on review comments, and submit to Delta Vision Blue Ribbon Task Force (cc Stakeholders Group, Authority, BDPAC).
5. Mount to discuss with Grindstaff the ISB's role in the End of Stage 1

conclusions, in particular with respect to (a) reviewing the CALFED science behind the conclusions and (b) analyzing how well the science supports the conclusions.

6. McKinney, Keller, Smith to review DRMS report and recommend response to the ISB.
7. Mount and Glaze to develop a direction for an ISB "strategic plan" (terminology might be instead "strategic effort," "strategic thinking," "philosophy") and develop a straw document to provide to the ISB.
8. Mount to provide written summaries to ISB members on meetings he attends

All Board Members

9. Comments on letter to the Blue Ribbon Task Force regarding the PPIC report.
10. ISB members to send comments to Healey (cc Mount) regarding the qualities that a replacement ISB member should possess, including research area and focus, sex/race diversity, etc.
11. ISB members to recruit already-identified candidates for Lead Scientist position through individual contact.

CALFED Science Program Staff with Lead Scientist

12. Healey to organize a meeting between ISB members and SP staff at the June meeting. This might be a lunch meeting with the purpose of the groups getting to know each other.
13. Healey to consider including both a *vision* and a *narrative* in the SP Strategic Plan. The narrative would contain at least address historical perspective—e.g., what has been learned about the Bay-Delta system over the first seven years of CALFED, and a future orientation—i.e., how the SP will achieve its vision.
14. SP staff to decide whether ISB members individually or as a group will be involved in peer review of parts of the draft State of Science report (as opposed to general ISB review of the final document), and schedule any reviews.
15. SP staff to recruit peer reviewers for the State of Science report as soon as possible.
16. SP will post all presentations and handouts

Presentations

February 21, 2007

CALFED Director's Update – Joe Grindstaff

Water Quality Performance Measures – Elizabeth Soderstrom

Water Quality Performance Measures: Overview, Ecosystem and Human Health – Carolyn Yale

Water Quality Performance Measures: Status of Phase 1 Water Quality Indicators – Lisa Holm

Envisioning Futures for the Sacramento-San Joaquin Delta – Jay Lund

February 22, 2007

Lead Scientist Report – Michael Healey

State of Science for the Bay-Delta System Report – Jana Machula

DRERIP: Scientifically Evaluating Restoration Actions – Denise Reed

2006 Environmental Water Account Science Panel Review – Matt Nobriga

Meeting Summary, Wednesday, February 21

Attendees

ISB Members

Jeff Mount (Chair)
Judith Meyer (Vice-chair)
Antonio Baptista
Bill Glaze
Peter Goodwin

Jack Keller
Daene McKinney
Richard Norgaard
Duncan Patten
Paul Smith
Bob Twiss (in attendance by phone for the afternoon session)

Welcome and Introductions – Mount

Board Disclosures

Mount has participated on an informal levees policy group to the Department of Water Resources (DWR) for the last month and a half. It is as yet uncertain whether this will become a formal group. He is also a co-author on *Envisioning Futures for the Sacramento-San Joaquin Delta* put out by the Public Policy Institute of California, a non-profit group. He received a partial month's salary over the summer for his participation.

Update on Board Activities

At the recent joint CALFED Bay-Delta Authority and Bay-Delta Public Advisory Committee (BDPAC) meeting, Mount discussed the two Independent Science Board (ISB) letters: (1) recommendation that ecosystem risk assessment be included in agency plans, currently under discussion, and (2) ISB work with agencies — Meyer and Patten as representatives — to structure Ecosystem Restoration Project (ERP) oversight, in the absence of the Ecosystem Restoration Program Science Program (ERPSB). Mount's report on progress in ISB and Science Program discussions about performance measures was well received. His report that investment in science is disproportionately small with respect to the significance of current science issues provoked lively discussion.

CALFED Director's Update – Joe Grindstaff

CALFED Director Joe Grindstaff reported that CALFED has three areas of focus, in addition to other important and ongoing issues: the *End of Stage 1 Report*, Delta Vision, and the Bay-Delta Conservation Plan (BDCP).

The *End of Stage 1 Report* is driven by state agencies, and required by the CALFED *Record of Decision (ROD)*. It will evaluate whether continuing on the present course and using the Delta for conveyance of fresh water can meet program objectives. The first part of the report is scheduled to be finished September 2007 and will include assessing decisions for next steps. The second part of the report will be integrated with the Delta Vision and BDCP efforts.

The governor has required the Delta Vision effort. There are two groups carrying out this effort: the Blue Ribbon Task Force (members appointed by the governor) and a Stakeholders Group. This effort is independent of both CALFED and other state agencies. Its purpose is to develop from a broad perspective sustainable Delta. The Task Force's Delta Vision report is scheduled to be complete by the end of 2007. A strategic plan and an implementation plan will follow in October 2008, with the cabinet committee making final recommendations to the governor and the state legislature in December.

The BDCP is a Federal Habitat Conservation Plan (HCP) and California Natural Community Conservation Plan (NCCP). The BDCP's development is driven by applicants, which are principally water users. The program's goal is to be 75 percent complete by the end of 2007.

Delta Vision

There are two committees responsible for gathering information for decisions and recommendations in the Delta Vision report: the appointed Blue Ribbon Task Force and the Stakeholders Group. Additionally, CALFED will provide science advice through the Lead Scientist and the ISB chair. Both will attend Blue Ribbon Task Force meetings, provide input, and report back to the CALFED

Science Program and the ISB. The Blue Ribbon Task Force has ultimate responsibility for developing all decisions and recommendations.

The first meeting of the Blue Ribbon Task Force and of the Stakeholders Group is scheduled for the week of February 26, 2007. Membership of the Blue Ribbon Task Force is: Phillip Isenberg, chair; Monica Florian; Richard Frank; Thomas McKernan; Sunne Wright McPeak; William Rielly; and Raymond Seed. John Kirlin is executive director. Member biographies are available online at http://deltavision.ca.gov/DeltaVision BlueRibbon.shtml

The Stakeholders group will have 41 members, representing a wide range of interests in the Delta, and will provide suggestions to the Blue Ribbon Task Force.

Discussion

Science Advice

Leo Winternitz clarified that the ISB will be able to make recommendations to the Task Force through both Mount and Healey. He noted, however, that at the time, no details have yet been worked out for integrating science into the Delta Vision process. He further stated his hope that these advisors will be called to also work with the Stakeholders Group.

The science advisors need to decide whether they will play a reactive and evaluative role, or whether they will also be proactive.

Important sources of scientific information for the Delta Vision process are the *End of Stage 1 Report* and the *State of Science for the Bay Delta System* report. The ISB can play a role in pulling the information together.

The Task Force will have access to funds for additional science studies as necessary. Grindstaff noted that the limiting factor on generating new knowledge would be time rather than funding.

Legal Issues

Water supply issues and legal ramifications could become a factor in Delta Vision deliberations. One example, the pelagic organism decline (POD) crisis in the Delta has led to a number of lawsuits. These lawsuits, which could start reaching conclusions in spring 2007, could drive decisions that affect the Delta Vision process. Additionally, the Environmental Water Account (EWA) that was renewed in 2004 and extended to the end of 2007, might run out of money this year, perhaps in April. This would lead to actions that the EWA has helped avoid. These actions would be a signal that the current approach is not working, and that a new plan is needed.

Further, Federal projects require development of Operating Criteria and Procedures (OCAP). The operating criteria developed in 2004 for the EWA, was flawed, and both the National Oceanographic and Atmospheric Administration (NOAA) and US Fish and Wildlife Service (USFWS) have agreed to re-consult. The new OCAP and the new consultation are planned to be complete in mid-2008.

Other Important and Ongoing Issues

Water Quality Expert Panel

The ROD specifies that an expert panel should be established to deal with water quality issues and meeting standards. Glaze and Grindstaff met with stakeholders — specifically, urban water agencies — to discuss this issue.

Grindstaff requested the ISB ask the lead scientist to call together this expert panel to document the quality of water exported from the Delta over the past five years, examining contaminants, and evaluating health risks to the public. This ad hoc panel would produce a public report that would be used for the *End of Stage 1 Report* and the Delta Vision effort. The ISB would review the charge to the panel, comment on membership of the panel, and review the panel's final product that should be completed by September 2007. Because of this short time schedule, the ISB should encourage a quick response from the lead scientist.

The panel will rely on existing data. How that data will be assembled, who will assemble it, and whose budget will fund the effort is still under consideration.

Baptista recommended that no new panels be convened until it is clear what kind of outcome is needed and how it will be used. Mount recognized this input as valuable, adding that the ISB has not resolved this question.

Ecosystem Restoration Expert Panel

The ROD calls for an ecosystem restoration expert panel with emphasis on fisheries recovery (ROD pg. 22). Progress on this panel has not advanced. Meyer and Patten will review the ROD to learn what is expected from this panel. Healey suggested that members of the ERP Science Board would be good candidates for this panel.

Discussion: Maintaining "Relevance" of ISB and Science Panels

Patten expressed concern that other important activities that would use this information are making progress so quickly that the panel might not be able to produce useful information in a timely manner.

Healey noted three things that the ISB should do to maximize their effectiveness: (1) contribute to the Science Program's strategic plan; (2) be strategic in what it works on by focusing on the Science Program's weak points in order to encourage it to do better, and (3) make positive statements about the program as these carry a lot of weight.

The ISB should perhaps meet more frequently to have greater impact. Science Program staff, with input from ISB, will explore possible ways to have "virtual" meetings between face-to-face meetings. These would include conference calling and perhaps also a web-based file-sharing capability or web-cast.

Funding

Lead Scientist Healey stated that he has requested $8 million in state funding for the Science Program. This request is in process, and will ultimately go before the state legislature. Grindstaff expects the request to be successful, especially if the ISB is involved in listing and justifying the important issues to fund. Grindstaff also noted that with the Science Program's strategic plan, requests for budgeting will be easier to justify because they will be in the context of a longer term program rather than yearly requests.

Performance Measures: Water Quality – Elizabeth Soderstrom, Carolyn Yale, and Lisa Holm

Performance Measures – Soderstrom

Elizabeth Soderstrom, liaison to the performance measures subcommittee, stated that there are several pressures accelerating the pace of performance measure development, including End of Stage 1 assessment, agency and stakeholder concern, and the governor's executive order requiring both performance measures and website presence for projects funded through propositions 84 and 1E.

There are two types of performance measure that are of current concern: (1) retrospective performance measures that are useful for evaluating End of Stage 1 decisions, and (2) future-oriented performance measures for assessing the results of future actions. This division exists because Stage 1 is required by the ROD to use certain measures, however, these measures may not be the most useful for assessing future performance.

Because of the lack of retrospective measures for evaluating Stage 1 decisions, ISB had challenged stakeholders to help contribute. A BDPAC subcommittee, consisting of Tim Quinn, Steve Johnson, Sue Garrett-Dukes, and Wendy Halverson-Martin, has developed high-level aggregate assessments of performance for the four main objectives of CALFED. These assessments should be useful to both the legislature and agency directors. The draft

performance measure documents available at today's ISB meeting are currently in review by BDPAC subcommittees and agencies, and will be presented after revision to the ISB in June. The product will include a format for reporting to the legislature and the public. Comments from ISB members during the interim period are welcome. Soderstrom and Hastings are working with the Performance Measure Subcommittee to develop a framework for analysis of future-oriented performance measures to be complete by June 2007. Performance measures will be of three types: level 1 will track administrative issues such as money spent, acres restored, etc.; level 2 will focus on output indicators and drivers; and level 3 will focus on outcomes. Future work will be increasingly focused on level 3 performance measures and outcome indicators.

PowerPoint slides for the following presentations can be found on the ISB website.

Water Quality Performance Measures: Ecosystems and Human Health – Carolyn Yale

Carolyn Yale, Environmental Protection Agency, is working with the subgroup developing future-oriented indicators for drinking water quality and related beneficial uses for both ecosystems and human health. A draft *Study Plan* from the Water Quality Subgroup and a draft complimentary document describing monitoring tasks and a discussion of developing indicators have been released. The topics covered in this presentation to the ISB are: (1) a review of the draft *Phase 1 Report* and (2) an update of the main work plan elements, which includes evaluating a suite of water quality parameters and selecting indicators for causal factors ("drivers"), intermediate outcomes, and "system outcomes."

Discussion

Patten and Mount suggested strongly that the workgroup do a preliminary exercise to populate potential indicators with existing data. Some elements do have enough data, for example mercury.

Yale noted that the presentation in June would include a more detailed *Phase 1 Report*, including detailed studies of specific topics, such as selenium. Mount suggested that selenium would be an appropriate topic to choose for the preliminary exercise.

Mount asked whether a timeline for Phase 2 indicators had been developed. Yale did not know, but said that the report is scheduled to be complete by the end of 2007.

Hastings noted that the Phase 1 report being done for all four CALFED subgroups is intended to look at big-picture goals and objectives, and identify three to five big-picture outcome indicators. For each indicator, the workgroups will establish whether an appropriate available conceptual model exists, identify important level 2 and level 3 drivers, identify available data, and put together a

plan for acquiring the data.

Patten expressed concern that the conceptual models must be simplified enough to allow insight into what is happening in a system; the subgroup should be careful not to use overly complicated models. Hastings noted that the workgroup would evaluate available conceptual models for the critical drivers with the largest magnitude of outcome. Yale added that the workgroup intends to issue guidelines to groups developing conceptual models; the ISB is invited to advise.

Norgaard expressed concern that the conceptual models discussed seem to treat the Delta as a unified body of water as opposed to a mosaic with spatial, temporal, tidal, and other components. Hastings responded that models specific to each habitat type are in progress; these can be overlaid on a map.

Water Quality Performance Measures: Drinking Water Quality – Lisa Holm

Lisa Holm, CALFED Water Quality Program, noted that drinking water quality performance measures must be based on the program's goals. These are to continuously improve source water quality allowing municipal water suppliers to deliver safe, reliable, and affordable drinking water meeting, and where feasible, exceeding applicable drinking water standards, in a cost effective way. Performance measures must also be based on program objectives concerning bromide and organic carbon. These are to achieve either (a) average concentrations of 50 mg/L bromide and 3.0 mg/L total organic carbon at Clifton Court Forebay and other southern and central Delta drinking water intakes, or (b) provide an equivalent level of public health protection using a cost-effective combination of alternative source waters, source control, or treatment technologies.

The drivers under consideration by the workgroup are pollutants, water management, Delta hydrodynamics, and hydrology. Outputs (intermediate outcomes) include levels of salinity, nutrients, organic carbon, pathogens, and overall Delta water quality. The outcome of performance measures is water quality at the pumps.

Glaze noted that the number of parameters seems to be limited; is this because staff is lacking to handle the information, or because other parameters are not judged to important? Holm responded that the parameters were chosen based on availability of data and their relevance. More constituents will be considered as the workgroup starts to work with treatment plants. Outcomes that are important to stakeholders are public health, treatment costs, and reliability and flexibility. The workgroup is trying to build a better understanding of reliability and flexibility and what influences decisions by water utilities.

Organic Carbon

A generic source control figure for organic carbon was shown. The workgroup

looked at seasonality in the data and grouped dry and wet seasons rather than combining the data as one data set. Research has shown that Sacramento Valley organic carbon is driven by storms. The San Joaquin River has a dramatically increased scale from the Sacramento River representations.

Healey asked whether the decline in dissolved organic carbon moving downstream was a result of dilution? Holm responded that these watercourses contain a lot of water. A high flow, low load in the Sacramento River looks deceptively bigger than a low flow, high load in the San Joaquin River.

Discussion

Smith asked whether the spikes in the charts presented might have occurred in other places but not been detected? Holm responded that she thought the bigger concern was whether the data was input incorrectly. The workgroup is assessing the quality assurance and control of the data with the US Geological Survey (USGS) but for now must work with the data that is available. It would be helpful to have the Department of Fish and Game (DFG) get fish hatcheries to participate in some of the monitoring. Currently they have not responded to the workgroup.

Mount noted that the workgroup is forced to use existing tools — which is a mixed bag. He asked how well that is working. For example, with the Delta Simulation Model II (DSM2), there is concern that modeling and sampling took place at different time scales, and that matching results to other models could be problematic. Holm responded that, for example, on the San Joaquin side for fingerprinting, the workgroup has tried to match daily modeling and translate that to year-type modeling. Essentially, it was broken up as if one understands the loading coming out of the rivers and does not need the daily concentration. That concentration based on flow dynamics is taken and used in the workgroup's transport model. It is agreed that there are very different time scales in the data.

Baptista remarked that the fingerprinting exercise is quite promising. That is the type of issue that is of general importance but also specific enough to be useful. It is a great example of what the ISB should be looking at. He suggested that this is a good opportunity for the ISB to understand how work is being done and make recommendations for changes or endorsements.

Meyer asked, how much of the presented material would be in the *Phase 1 Report* that the ISB will review? Holm responded that it would all be present. Meyer reiterated that the point for the ISB is to have input.

Baptista expressed the need for another level of detail. Holm responded that when the website is active it should all be there.

Mount asked what the workgroup is going to do about in-Delta sources. Holm responded that they would like to have projects there, also. Using DSM2 there could be some measurements on drains. Better monitoring will be done along the way. All of this, though, takes money — something the workgroup does not have.

Goodwin asked, what kind of database is being used to manage all of the incoming data? Holm responded that the workgroup is working with Carl Jacobs and the big California databases from many different sources to create the drinking water quality database. It does not include USGS or Municipal Water Quality Investigation's databases; those have been added through Excel. However, the workgroup does not have a good database and the problem of setting up time periods when new data is collected has not been solved. Goodwin remarked that it is key for long-term researchers to be able to look at the data. Holm agreed and noted that many different people are currently being paid to pull together the same information. Within the data, there are a number of different sources with different names for the same locales. The goal is to have a web-based system pulling information from other databases so that none of it is redundant.

Goodwin stated that, if a dataset is ready to be populated, important databases are the EPA and NSF tools and supercomputing centers. Mount noted that for an earlier iteration of the ISB, that was a big issue. The problem is that no one wants to repeat analyses of old data and expand it, whereas it should be a priority to be able to assimilate monitoring and real time data and add to it. The ISB could consult on how to structure something like this because a high priority for CALFED is monitoring and data assimilation. Holm responded that in workshops, new data sets are found all the time. The workgroup recognizes that their database is static, but that they have neither the time nor the expertise to address this now.

Goodwin noted that even if other agencies have responsibilities to collect subsets of data, the value of bringing it all together is greater. Problematically, there could be conflicting databases, and no agency has enough of an overview to find them, USGS maybe the closest. Holm responded that perhaps the workgroup's assessment would spark others to say what data has not been used. The group has tried several times over years to bring a group together for such discussions, but with little progress.

Next Steps

Next step for the workgroup is analysis. There is a lot of good data for total trihalomethanes. Plants have been looked at how they are performing relative to CALFED'S goals. Many disinfection byproducts have not yet been covered. A few plants in the south Delta have occasional problems with trihalomethanes and other byproducts. For turbidity and total dissolved solids, the workgroup has data on source water into plants and are looking at that for organic carbon levels. The workgroup will pick five to ten representative treatment plants to model and determine if there are other important constituents to look at. The whole data set will inform drinking water policy, and will spell out what the beneficial use is and any issues.

Mount remarked that an economic optimization model is needed and asked whether such a tool is available. Holm responded that economic expertise lies with the consultants. The workgroup's initial focus is to look to the American

Water Association Research Foundation. Metropolitan Water District also has a really good economic model that could help with that analysis.

Schedule

The projected schedule is to have draft chapters by the end of July 2007 and final drafts by September 2007, but if the work is not done the group will continue. The final draft document is due by the end of October 2007. The workgroup will lay out Stage 2 priorities in September and October. There is as yet no peer review process established. The group would like to do one and perhaps work with the ISB to identify an approach.

Discussion

Patten asked, do the processes indicate where monitoring investments should be made? Holm responded that DWR has a real-time forecasting project extending DSM2 into the California aqueduct.

Patten asked, considering the dynamic quality of the data, is the fact that the current work is based on static data undercut the validity of monitoring in the future? Holm responded that it is an issue with measuring organic carbon, which is highly variable and reactive.

Baptista is glad to see modeling used in analysis; it will become more and more important. This workgroup should spend the time to make sure that the models used for the foundation of this effort are the most appropriate. He asked whether the workgroup has a process for evaluating models against competing models. Holm responded that the DSM2 model has been extensively evaluated for salinity, the workgroup is looking at boundary conditions for organic carbon, another group is evaluating these models for gaps in their analysis, and a separate recalibration and verification effort is in progress. Goodwin suggested that the Bay-Delta modeling forum would likely be an ideal forum to determine whether there is broad confidence in the models.

Glaze asked whether the document would address beneficial uses of water other than drinking water. Holm responded that agriculture would be considered to the extent that the workgroup can address it. Ecosystem water quality will be addressed by DRERIP. Hastings noted that if a second panel is appointed, they could cover this. Mount replied that there is as yet no charge for a second panel.

Glaze noted that while today's presentations did a good job representing the large amount of work being done in this area, the assessment would not be complete enough to satisfy many people. Healey responded that this topic should be incorporated into a future ISB meeting agenda.

Public Policy Institute of California Report: *Envisioning Futures for the Sacramento–San Joaquin Delta* – Jay Lund

Jay Lund, University of California at Davis: This report was initiated and hosted by the Public Policy Institute of California (PPIC), and co-sponsored by UC Davis. The report is not a scientific document, but a general strategic assessment, considering Delta alternatives through a technical and scientific viewpoint. This report is non-partisan, and not associated with particular stakeholders. Lund explained the driving factors and tools used in developing and evaluating nine alternatives for the delta.

- **Freshwater Delta**

  1. Levees as usual: Delta and Delta levees managed as now.

  2. Fortress Delta: Based on Dutch model, increases armoring on levees, aids urbanization. Lost Delta islands not worth saving

  3. Seaward seawater barrier: Prevents seawater intrusion but not island flooding.

- **Fluctuating Delta**

  4. Peripheral Canal "plus."

  5. South Delta restoration aqueduct: Questions include where intake and outtake should be; number of intakes and outtakes, and size of pipes.

  6. Armored-island aqueduct or through-Delta: Armor the levees on the through-Delta aqueduct. Keep east Delta fresh, allow west Delta to fluctuate.

- **Reduced-Exports Delta**

  7. Opportunistic Delta: Restores more natural fluctuations. West and central Delta would fluctuate; exports would be variable.

  8. "Eco-Delta:" Similar to the opportunistic Delta approach, above, however more extreme.

  9. Abandoned Delta: Letting nature take its course. Vast portion of west and central Delta would fail, with a two-in-three probability of massive failure. There would be no exports.

The report looked at screening out unviable alternatives based on a set of criteria. Overall, they found that fluctuating Delta alternatives are the most promising.

Recommendations

Long Term

- Focus on promising alternatives and exclude from consideration the unpromising alternatives.
- Develop a technical track for developing solutions for the Delta for both science and engineering.
- Enhance regional and statewide representation on local land-use decisions (e.g., BCDC).
- Implement “beneficiaries pay” financing. There is not enough money in federal and state governments to pay for Delta repairs and management. We should make people commit up front to pay like the State Water Project.
- Develop mitigation mechanisms to compensate parties who lose benefits.

Short Term

- Improve emergency preparedness.
- Develop a “do not resuscitate” list for some islands, rather than repairing any levee breach automatically.
- Improve Delta land use guidelines for urbanization, including flood control guidelines and habitat protection.
- Implement quickly effective restoration projects for pelagic fish.

Science Implications

- Develop a solution-oriented scientific and technical program with the following emphases:
  - Planned research and development, integrated program.
  - Biological studies.
  - Hydrodynamic studies.
  - Studies of economics and institutional processes.
  - Operations studies.
  - Systems analysis.
- Increase institutional support. Promising solutions are unlikely to arise from a stakeholder-only process. Scientific and technical expertise contributes to the solution and stimulates stakeholder processes.
- Continue basic research.

Board Questions and Comments

Patten asked how the team developed the nine alternatives presented in the report. Lund responded that the alternatives needed to address the services that the Delta provides; include current policies, and a "hardening" of those policies; and include historical alternatives such as the saltwater barrier, peripheral canal and Delta abandonment. Alternatives also needed to span a wide range of choices and be limited to a small number of alternatives that would be easy for policy-makers to conceptualize.

McKinney noted that some issues would be relevant regardless of alternative. For example, smaller, more flexible, special-purpose storage strategically located around the Delta, might be beneficial. Conversely, as exports from the Delta are limited, conveyance becomes more valuable than increasing storage, this issue should be considered more closely. Finally, the economic value of farming on Delta islands is not very high.

Norgaard remarked on strong points of the report, in particular, its historical content and its message that the Delta must be considered in both context and over time, in addition to its role as a catalyst for future discussion. He expressed concern that the report's recommendations are premature.

A member of the public noted that the areas at most risk in the Delta are also both the most expensive to protect and the areas with the lowest value crops. Economics and environmental considerations are in alignment.

Mount observed that the "business as usual" alternative, to support native fish, would be successful only with substantial ecosystem restoration. The abandoned Delta, because no restoration would take place, could not support native fish. Moyle's plan for a Delta that would support native fish populations has the elements of a brackish rather than freshwater Suisun Marsh, and the salinity gradient in the north and south Delta would be restored, especially Cache Slough and upper Yolo Bypass. A fluctuating salinity regime is also needed.

Meyer noted that a clearer modeling approach to understanding the Delta ecosystems and environmental consequences of actions is needed. Meyer also expressed concern that the current approach focuses on current invasive species rather than on invasive species that we can anticipate in the future. She noted that a fluctuating environment is not necessarily a protection against invasive species. Norgaard followed that it is not clear what the term "native species" will denote in 50 years, particularly in the context of climate change. Lund responded that the proposed alternatives are understood under the assumption that the Environmental Species Act will continue to dictate which species must be preserved, and does not anticipate how species will be protected in a future environment altered by climate changes.

Patten asked, would any proposed scenario benefit from additional offsite storage? Lund replied that more storage is always better for operational capability, but the issue is whether more storage is cost-effective. CALVIN model results suggest that more south Delta storage would not be cost-effective.

Goodwin observed parallels between the scenarios of the San Francisco Bay-Delta and coastal Louisiana. Specifically, changing societal priorities, a long history of consensus-type solutions that require all sides to capitulate on one or more issues, a history of "band-aid" solutions. He stated that this report is a good contribution towards a broader discussion. In order for a systemic change to be possible, the *modus operandi* and expectations of agencies and stakeholders will need to evolve.

Goodwin asked whether Lund, as speaker for the authors, believed that science and modeling tools could address Delta issues in the timeframe in which the next major decisions could be made, and whether he felt that there were major gaps in knowledge that the ISB and Science Program should be concerned with. Lund replied that the authors have begun to assess existing tools. Some tools exist that are adequate for the beginning of an evaluation, but the data, especially for boundary conditions, does not yet exist to enable complete analysis. Lund acknowledged that the report takes an approach to the Delta that is different from the assumptions behind current models. A long-term research and development program is needed.

Goodwin suggested another alternative, that the west Delta be dedicated to ecosystem, while different geographic areas of the Delta could be dedicated to different priorities. Lund responded that as modeling capabilities improve this approach could be refined.

Baptista argued that this report is a cogent, comprehensive evaluation of the Delta. The ISB should evaluate whether the report's approach provides a useful conceptual framework, and then if appropriate advocate for continued study within this framework, including recommending development of tools and identification of alternatives that are missing from this analysis. Mount would be excluded from these discussions because of his role as co-author of the study.

Glaze asked - did the co-authors identify any alternatives that are important to consider that are not represented in the report? Hanak replied that one of the chapters suggests that while alternatives discussed in the report are broad and conceptual, an optimal solution may likely be a hybrid of the identified alternatives, for example, a hybrid of through-Delta plus conveyance facility.

Glaze remarked that not only the periphery but also the inner areas of the Delta are being developed. This urbanization will exert tremendous pressure on the Delta's evolution, and will likely lead to the Delta being considered and managed as a park. Lund noted that a report is being developed treating the Delta in this manner.

Glaze asked what next steps are appropriate. Lund replied that more fundamental knowledge is needed, for instance, definition of appropriate fluctuating salinity, and more laboratory studies of selected species. It would be premature to refine the alternatives before development of better scientific and technical understanding of the alternatives.

Twiss added that the charrettes contained in the report are useful, whether or not individual scenarios are ultimately used. They draw attention to criteria for

strategies and plans, and suggest scientific questions that could be used during vetting of proposed actions. The ISB could take on the role of vetting ideas from the Blue Ribbon Task Force, the stakeholder group, from reports such as this one, and so forth; highlighting long-term certainties and uncertainties; and suggesting ways to integrate the disparate efforts such as CASCADE modeling, DRERIP, Delta Vision, and so forth. Strategies in the coming months could including running models, evaluating conceptual models, holding workshops and symposia, and facilitating joint fact-finding efforts. Mount noted that there would be a presentation on the CASCADE modeling effort at the Estuary meeting in September. The models used in CASCADE will take a while to complete, and thus will not be directly useful to the Blue Ribbon Task Force, but will be useful in the long term. Smith noted that analyses should recognize that fish population numbers vary naturally from year-to-year.

Keller expressed that a 30,000-foot view of the Delta system has been lacking, and this report addresses that need. Keller finds that the report slants toward a peripheral canal or aqueduct. However, these could be completed at the soonest within 20 years, and the possibility of disaster within that time period is 50 percent. Further, there is no plan for transitioning scientific and policy thinking from the current view toward a new view. The analysis of alternatives must consider how to get from the current approach to the new approach. Lund replied that the report is not intended to advocate a peripheral canal, but to point out unviable alternatives. Keller replied that supporters of the peripheral canal could see this report as an endorsement.

Norgaard suggested that the analysis also include adaptation dynamics and resilience as one of the evaluation criteria. Lund replied that this lied outside the scope of the co-authors' authority.

Patten noted the strength of this document is that it is not absolute, but can serve to spark future conversation on possible Delta futures.

Meyer commented that the report included cost estimates but did not seem to include benefit estimates. Lund responded that the benefits are implicit in the scarcity costs. The entire analysis is driven by economic demand functions, i.e., how much will people pay for water? However, ecological benefits are not part of the implicit benefit estimates.

Healey expressed that the report presents the Delta problem as a landscape problem, with spatial relationships inherent in the problem. However, the report does not develop the need for further research on spatial elements in the system. Lund replied that they sketched out a land use optimization model to stimulate further thinking along these lines, especially 2-dimensional modeling. Further work is being done in this area using geographic information services (GIS) at UC Davis and UC Berkeley.

Public Comment

Mike Conner, Executive Director, San Francisco Estuary Institute: The report is

stimulating productive conversation. However a weakness of the report is the criteria selected. Specifically, it is too early in analysis to eliminate any criteria. He suggested that the ISB consider the criteria and try to determine whether these are the "right" criteria to develop and distinguish among alternatives. It is not clear that the three criteria of environment, economics, and water exports adequately capture the way that the public values the Delta. Lund commented that this is a useful point of view, and invited suggestions.

Meyer asked what criteria Conner would suggest. He suggested that for environmental criteria, the mix of habitats is correct, but it's not clear that fluctuating salinity is a good criterion. It is also unclear whether invasive species is a reasonable criterion, particular because it is not clear how invasive species will be controlled in the future. Finally, the special social nature of the Delta inhabitants should be considered.

Mount noted that the preferences of the Delta inhabitants do not change the inexorable forces of climate change, subsidence, invasive species, and earthquakes.

Lund noted that the concept of "beneficiary pays" is netting benefits to the Delta; e.g., power lines across the Delta are resulting in a shoring up of the levees.

Pete Rhoads, Metropolitan Water District, Los Angeles: The report appropriately raises the question of salinity fluctuation in natural environments. The Everglades would have been severely damaged if fluctuation had been controlled, but this issue has not been emphasized in California water management. He also asked why the report does not discuss adaptive management. Lund replied from his individual perspective that the term "adaptive management" is so broadly understood that any discussion of the concept would have been counterproductive to the discussion that the report wanted to raise.

Sage Sweetwood, Board of Planning and Conservation League: This thought-provoking and well-written report should also include a discussion on alternative approaches to yield the same delivery goal. Lund noted that Appendix C on modeling, reviews management options from the CALVIN model. Sweetwood suggested that a footnote in the text direct the readership to the appendix.

Amy Richey, Mosaic Associates: Given the unofficial nature of this report and the fact that it represents a paradigm shift, how will it fit into future decision-making? Lund noted that the authors do not have authority to determine this, but the audiences who view the presentation do. They hope to stimulate leadership on the technical, scientific, and policy sides.

Board Discussion

It was decided that ISB would write a letter regarding the PPIC report to the Delta Vision Blue Ribbon Task Force. The letter is available on the ISB website.

Further Discussions on Today's Topics

Conference Calls

Chris Stevens, CBDA counsel, says that for a conference call, the public notice published 10 days in advance of an ISB conference call meeting would have to identify all locations from which ISB members would be calling in.

Mount noted that it will be useful for the ISB to meet by conference call between face-to-face meetings. Over the next two years, there will be an ongoing need for quick response on science issues; four meetings a year is not adequate. These conference calls will be called on an as-needed basis, with as much advance notice as possible for ISB members, preferably a month's notice.

ISB members suggested that the calls would be more effective if a web-based application is used to facilitate discussion. Mount and Fris will explore options that would allow ISB members and members of the public to participate in the call. CALFED can provide meeting space for public attendance.

Science Program Strategic Plan

Healey re-emphasized the need for ISB input into the strategic plan for the Science Program, and asked that one or two ISB members be dedicated to the task of providing input and guidance. This strategic plan will have two periods of focus concerning science input into decision-making: (1) the short-term needs for Delta Vision and BDCP, and (2) the long-term possibilities for Science Program contributions. Because the Science Program currently enjoys a great deal of goodwill at the governor's office and the state legislature, now is a good time to build the Science Program's vision. Grindstaff envisions the Science Program could become the science office for the state, especially to deal with issues of implementing the Delta Vision over the 30- to 40-year implementation, but also for other related science questions. The big questions transcend agency, state, federal, and local concerns.

The strategic plan for the next two or three years should be completed very quickly. The strategic plan for the longer term could remain un-formalized until the Delta Vision and BDCP have released documents.

The Science Program's tasks are to coordinate scientific activities across agencies, communicate science to a broad audience, stimulate new scientific activities within the Bay-Delta system, and assure that good science is being done. The strategic plan should address these tasks and also consider whether this is a sufficient list.

Discussion

McKinney asked whether any existing plans exist for the Science Program's strategy. Healey responded that the Stage 1 and Ten-Year Plans exist, but because the program is in transition, it is not clear how relevant these plans will be even in the short-term. McKinney asked if the ISB should review these as part of their preparation for providing input on the strategic plan. Healey agreed, and noted that other materials can also be mined for the strategic plan, including the report from the Blue Ribbon Task Force.

Glaze suggested that a workshop be added to the June meeting. There was discussion about the number of other issues to be discussed at that meeting. Healey said that this might be useful, but a framework and ideas to discuss at the workshop are necessary first.

Healey noted further that the ISB should have relevance beyond the Science Program, for example, as a watchdog on future activities. Additionally, the Science Program should be recognized as an independent budget item beyond CALFED to allow it to be more certain of its future. The infrastructure for science needs to be increased.

Discussion with Director

The ISB asked the CALFED Director Grindstaff how he sees the role of the ISB with respect to the *End of Stage 1 Report*.

Grindstaff noted that the key element is the *State of Science for the Bay-Delta System* report. Another concern is whether the estimated $10 billion for levee mitigation is appropriate. The ISB should direct the Ecosystem Restoration Program panel to consider the following.

- Is mitigation being done for flood work and levees appropriate and adequate? Panel should make recommendations.
- Engineers claim that the extensive mitigation will make levee prices too high. Comments?
- Is repair of levees always best for the ecosystem? For instance, areas with poor levees that experience regular minor flooding have ecosystem benefits. Has DWR considered this issue? It impacts the entire system.
- Has mitigation in the recent past been adequate and appropriate? Panel should make recommendations.
- How can we assure that the levee improvements are done with ecosystem benefits?

PPIC *Envisioning Futures* Report

Baptista posed the following questions from a science perspective about the PPIC

report discussed earlier in the day.

What kind of added value does this study offer? Grindstaff replied that it is valuable because it has the potential to help people make a paradigm shift. The study makes people think differently and holistically about the Delta.

What has been the reaction of state agencies and stakeholders? Grindstaff answered that most gubernatorial appointees are enthusiastic to learn about a range of possible choices. Further, the document says clearly if ecosystem restoration is a priority, there must be drastic changes in management of the Delta. Policymakers like the clarity of the document. There is more variability in response among stakeholders. Some Delta inhabitants have reacted negatively. However, the environmental community has reacted positively but cautiously, and the water supply community has been mostly supportive.

What gaps do you perceive? Grindstaff noted that cost and implications for water quality is the largest gap.

Thursday, February 22

Attendees

ISB Members

Jeff Mount (Chair)
Judith Meyer (Vice-chair)
Antonio Baptista
Bill Glaze
Peter Goodwin

Jack Keller

Daene McKinney
Richard Norgaard
Duncan Patten
Paul Smith
Bob Twiss (in attendance by phone for the afternoon session)

Lead Scientist Report (Healey)

Healey presented his first report to the ISB as Lead Scientist highlighting his vision for the CALFED Science Program and priorities for the next year. Healey's report is available on the ISB website.

State of Science for the Bay-Delta System Report – Machula

Jana Machula, CALFED Science Program presented an overview on progress towards the *State of the Science in the Bay-Delta System* report. The full presentation is available at the ISB website.

Discussion

This report will not include new science. Healey asked for ISB comment on the nature of language in the report, specifically, whether it should be a scientific report or policy-oriented report. Conclusion: the entire document should be appropriate for policy-makers in content and presentation, but peer review should be for scientific content. Norgaard suggested that a dedicated graphics editor be appointed now.

ISB members suggested external reviewers comment on the report during a two-day peer review panel in summer 2007. This would achieve greater consistency among peer review comments, and would encourage consideration of the Bay-Delta as a system. This panel might include time for actual rewriting.

Healey said that the Science Program would present draft chapters to the ISB in June as an update. Any comments will be welcome. The Science Program will be looking for feedback and whether the report addresses all issues that are key to End of Stage 1 decisions. Mount noted that this discussion might take place via conference call.

Keller expressed concern on behalf of several ISB members that the timeline is so aggressive that it could compromise the quality of the content. Norgaard said that the ISB should enter into a discussion with the Science Program concerning the scope of the first draft. Healey responded that it is most important that the Science Program produce this report this year, and that it address issues that are relevant for End of Stage 1 decisions. The document will grow over time.

Keller suggested that the Science Program submit outlines for the authors' chapters for ISB review. Healey responded that the authors will be asked to submit 10-page summaries of their chapters, and that if it seems the most strategic use of the ISB's time to discuss these, a conference call could be arranged.

DRERIP Briefing – Denise Reed

Denise Reed, science advisor to the Delta Regional Ecosystem Restoration Implementation Plan (DRERIP) and coordinator of the peer review process for conceptual models, presented an overview of the peer review process for DRERIP's conceptual models. The presentation included a background discussion of (1) the goals of DRERIP and the purpose of vetting, or scientific evaluation of proposed restoration actions; (2) DRERIP's approach to evaluation, including a description of the process for "vetting; (3) the role of conceptual models in the evaluation, and (4) conceptual model development, including guidelines for development and issues covered by the conceptual models in development. The discussion concluded with questions and recommendations from ISB members for issues to consider during the peer review process for conceptual models. Background documents and the PowerPoint presentation are available on the ISB website.

DRERIP will report back to the ISB in June with results of the first tier review process. They will provide the models and a tabulation of comment and response, with special attention to review comments that the authors did not address. This could be a voluminous report, so the ISB members might consider dividing responsibility for review among members. DRERIP hopes for commentary from the ISB on the end result, and in particular attention to whether the review panel have considered all relevant aspects and drawn appropriate conclusions.

Discussion

Healey remarked that a panel approach seems appropriate to this task. The collaboration among experts from different fields would improve the likelihood that the models will all hold together. Norgaard agreed that a team rather than individual peer review process is appropriate for this effort. The effort itself is collaborative and synthetic, and the review process should be as well. The interaction among experts is part of the value of this approach to peer review.

Patten noted that the review process should assess two issues: (1) usefulness of the models and (2) accuracy of the models. The ISB will look at these two issues as fundamental aspects of the review process. Reed agreed, and said she hoped that the review questions would yield insight into these two aspects. She requested comments on review questions. Meyer wondered whether species interactions are adequately addressed, and how geographically specific the models are intended to be.

Reed noted further that the review panel would likely have to consider not just an action in its entirety, but also its components: to get the complete picture, you "have to go down all the rabbit holes." The model should inform the vetting process. Meyer suggested that models be tested on example actions to demonstrate use and performance to model developers and reviewers. Meyer said that it should be made clear to the reviewers how the conceptual models are expected to interact with each other.

Smith asked how the scientific evaluation would address issues that involve conflict. For example, turbidity favors visual predators but disfavors those that hide in turbidity to avoid predation. Reed noted that the models will not make trade-off decisions, but rather will provide information for a decision-maker. The steps still in development, "feasibility determination" and "action prioritization," will be used for decisions.

Smith asked how the conceptual models treat timescale, acknowledging that the Delta is a dynamic and changing environment. Would the conceptual models address a species' ability to adapt to climate change? What species will be present in 50 years, given large environmental changes? Would the conceptual models address genetic draft? Reed noted that the time and space scales depicted in each model are described in each narrative. The other issues are important and need to be addressed.

Mount asked whether the conceptual models had a systematic approach to future conditions, e.g., whether there were any agreed upon future conditions for climate change. Reed responded that the evaluation is a process approach, not a scenario approach, and so does not involve specific future conditions. However, any thresholds for change should be reflected in the model.

Baptista asked which performance measures would be chosen. Reed noted that the processes and linkages represented in a conceptual model would be backed with data.

Norgaard draw an analogy between the proposed scientific evaluation process to the physicians' desk reference, with inputs, consequences, and side effects; and an ultimate goal of improving health. The process allows for diagnosis, documentation of the process of diagnosis, and recommendations for action. Although there is a process in place to aid diagnosis and treatment, it all ultimately comes down to expert judgment. Reed noted that this is a useful analogy, and that the DRERIP process includes a worksheet to document the evaluation process. Because not every expert will draw the same conclusions while using the conceptual model, it is essential to track the basis of decisions.

Keller recalled that the PPIC report (discussed above) refers to a paradigm shift in how the Delta is viewed, i.e., as a mixed Delta rather than a freshwater Delta. He asked whether the scientific evaluation would take this paradigm shift into account, and whether the panel reviewers should be aware of the report. Reed noted that the conceptual models do reflect the current understanding of the Delta system rather than the old view. The panel should be aware of the new view and take it into account during the review.

Norgaard remarked on a feedback problem with the reliability of a model if the model can only be used in concert with multiple models. Reed expressed agreement. Patten asked whether the panel would be able to determine whether a model is accurate. Reed noted that if there is debate about an issue, the model should reveal this and lead to alternative models.

McKinney expressed appreciation for DRERIP's approach toward distinguishing levels of uncertainty in modeling. Although it is not quantitative, it does avoid the question of uncertainty. Reed noted that this categorical approach is central to their modeling, and said that each judgment of uncertainty should be backed with justification in the narrative.

Baptista noted that each conceptual model would have some uncertainty associated with it, and linking the models would compound the uncertainty. Reed noted that they have not solved the problem of accumulating uncertainty. Baptista further recommended that the review process consider this issue carefully, including the subjectivity of how the uncertainty is represented in the arrows linking model elements, and how to propagate uncertainty along particular tasks. Reed noted that the guidelines about how to use the models should include direction to pay attention to the number of uncertainties in a particular evaluation. If there are a lot of "red arrows" in the models used in an evaluation, then there is a big caveat to the conclusions.

Opportunities

Healey suggested that DRERIP pursue dialogue with the modelers with the CASCADE project. Reed asked whether they should also be part of the review panel; Healey said yes, but he saw the real value in discussion.

Mount asked how the DRERIP work could be or is connected to the DRMS, the Delta Vision, and other efforts, and in particular whether this approach could be

integrated in a large-scale effort such as the Delta Vision. Reed noted that if the issue to be evaluated is both covered by a conceptual model and is articulated as "Do X to change Y to achieve Z," this approach could be used.

Baptista asked who would maintain the models. Reed noted that the model developers and sponsoring ERP agencies would retain "ownership." There is as yet no procedure for updating the models when new information becomes available, although Reed notes that there will be.

Baptista asked how people would be trained to use the models, and whether the models would be used to train people. Reed noted that system experts would work with model developers to learn to use the model effectively, although because the models will be freely available on the Internet, anyone could use them. The intention is to make the interface intuitive and easy to use, and the narrative clear, explicit, and compact, so that those who want to learn to use the model should have good starting points.

Healey said that he hopes the Science Program will take some ownership of model updating and training, and of encouraging the agencies to use them to evaluate planned actions. These models plus those from CASCADE should greatly improve the ability to assess outcomes of the visioning process. Mount also expressed hope that the Science Program would take ownership of these models and responsibility for updating and extending them. Reed said that if the Science Program does take ownership, it might be useful to include expert review in the long-term use of the models.

Goodwin expressed desire to understand how monitoring and consequences would provide feedback to enable refinement of the model.

Mount noted that the DRERIP process has great potential for extensive interaction with performance measures, and that the current performance measures efforts might be able to identify ways to benefit from the DRERIP work, including direct links.

Environmental Water Account briefing – Nobriga

Matthew Nobriga, CALFED Science Program: The Science Program and agency response to the Environmental Water Account (EWA) review will be drafted in April and submitted to the ISB in June for their review. Of particular concern for the ISB is whether the Science Program and agency response is appropriate, and whether the proposed approach is too ambitious or not ambitious enough.

It is generally noted that the EWA quickly accomplished water supply reliability goals. However, scientific understanding increased more slowly, accelerating only recently as a result of the POD investigation. Possible upcoming Tier 2 or Tier 3 situations could change water availability. The PowerPoint presentation is available on the ISB website.

Discussion

The June update will include a report that lists (1) the EWA review panel's recommendations, (2) the assessment by the Science Program and implementing agencies concerning whether CALFED will address those recommendations, and (3) a discussion of why, how, and in what timeline. Mount said that ISB comments on the report would have a great impact on decisions regarding the end of EWA or its extension in a modified form. Commenting on the value of the EWA and influencing decisions about its future should be one of the ISB's priorities. Healey noted that while it will not be possible to assess whether the EWA has improved the situation for listed species, the ISB can comment on what kind of EWA would be useful in the future.

To provide effective review, the ISB should see earlier Science Program and agency responses to earlier EWA reviews, to determine whether current responses are new or old responses to old recommendations that were never been implemented. There must be agency action, lacking in previous years, based on EWA review panel recommendations.

Patten asked whether the review panel addressed the institutional complication that several different environmental water accounts exist (e.g., EWA, b2, b3, EWP) that are not working on concert. Nobriga responded that the panel made recommendations concerning this institutional barrier.

Nobriga said, in answer to Keller's question, that the EWA operates based on the freshwater Delta paradigm. Mount noted, as a co-author of the PPIC report, that it would be premature for the EWA to change paradigms to a saltwater or fluctuating Delta.

Healey noted that a fundamental unknown for designing an effective EWA program is how much water is needed. Because this year might require a Tier 3 response, there might be opportunity to carry out experiments on the patterns and amounts of flow that would be optimal for EWA's purpose.

Baptista asked what would happen with the EWA next year if the panel determines that the main modeling tool, the particle-tracking model, is inappropriate. Nobriga responded that the panel is concerned not with the model but with the fact that the model has not been peer reviewed. The Science Program's role is to make sure the review takes place soon, and to hasten the development of alternative tools if the model is found to be lacking.

Meyer noted that the Science Program would have to decide whether EWA-related research would be a component of the next PSP.

Public Comment

Tina Swanson, senior scientist, The Bay Institute: In today's meeting, the ISB and presenters several times commented on the need for improved understanding of transferring science to policy. An expert in this field would be a valuable

addition to the ISB. The last two chapters of the *State of Science for the Bay-delta System* report, performance measures and transfers relate directly to this issue. However, the presentation suggested that these chapters would take a theoretical and hypothetical perspective rather than a practical perspective. The lack of focus on how to transfer science to policy is of great concern. The report is supposed to summarize what has been learned over Stage 1, and science transfer should be a valuable component.

A primary purpose of adaptive management is to feed new scientific information back into policy decisions. CALFED has greatly improved the state of scientific knowledge of the Bay-Delta system, but recommendations based on that knowledge have too frequently not been implemented. The framework for Bay-Delta policy for the next many years is now being set, and CALFED must make rapid progress in the science-to-policy transfer process very soon. The ISB should consider whether the transfer of science to policy is lacking, and if so, should make a statement to this effect.

Healey responded that while transfer could be improved, huge policy changes have taken place over the past years; e.g., the original policy view of the Bay-Delta was "we're all getting better together," but there is now broad agreement that progress will involve some negotiation among parties competing for scarce resources. The Delta Vision process is in response.

CALFED has not regularly done a systematic evaluation of how science transfers to policy. The *State of Science for the Bay-Delta System* report will begin to address this question, but the first issue will not be comprehensive. Further, the Science Program is making progress in performance measures.

Tom Mungin, Delta-Mendota Water Authority: There is a logical inconsistency in the EWA review report. On pages 5 and 30, the report stated clearly that recent wet years have not helped fish in the way that would be expected, but the report said that more water was needed for the EWA, without further justification. Healey agreed that this issue should be addressed.

Wrap-Up

ISB Membership

With the vacancy of Healey from the ISB to become lead scientist, there are now 11 members on the ISB, which is allowed a maximum of 12. ISB members are invited to submit comments or recommendations for a new member to Healey, and Mount. Of particular interest is whether the new member should be an ecologist, represented by Healey, or whether another expertise should be higher priority. Comments on social diversity of membership are welcome.

ISB Representation in Delta Vision Process

Mount as a representative on the Delta Vision Blue Ribbon Task Force will speak for the ISB, but also sometimes will speak from his own understanding of the state of knowledge. Healey will help guide him to distinguish these.

Lead Scientist Search

Healey and Mount will contact ISB members regularly regarding progress in the Lead Scientist search.

Future Meeting Items

Potential Agenda items for June:

- DRMS review/response (McKinney, Keller, Smith)
- EWA review/response
- Performance measures update
- SOSBDS report
- ISB "strategy"
- DRERIP comment/response
- Lead Scientist recruitment
- Water quality panel?
- ERP assessment?
- PSP priorities discussion
- Science Program strategic plan
- Comment on levee program mitigation

ISB "Strategic Plan"

The ISB should develop a document that outlines its approach; a "strategic effort," "strategic thinking," or "philosophy" document. Issues that it might include are the following.

- Role of ISB in encouraging synthesis.
- Response-to-review committee, similar to the National Academy's.

Mount, Meyer, and Healey will coordinate with Glaze on formalizing the approach.